



US009636734B2

(12) **United States Patent**
Baudy

(10) **Patent No.:** **US 9,636,734 B2**
(45) **Date of Patent:** **May 2, 2017**

(54) **TUBE NOTCHING METHOD AND ASSOCIATED NOTCHING MACHINE**

(58) **Field of Classification Search**

CPC B21D 17/00; B21D 17/02; B21D 22/02;
B21D 22/025; B21D 22/04; B21D 22/06;
(Continued)

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(56) **References Cited**

U.S. PATENT DOCUMENTS

2,697,953 A * 12/1954 Chapman B21D 22/04
72/356
4,582,259 A * 4/1986 Hoover B21D 28/28
72/335

(Continued)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 252 days.

FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **14/408,271**

FR 2816857 A1 5/2002
FR 2842752 A1 1/2004
JP 59193731 A 11/1984

(22) PCT Filed: **Jun. 12, 2013**

(86) PCT No.: **PCT/FR2013/051373**

§ 371 (c)(1),

(2) Date: **Dec. 15, 2014**

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(87) PCT Pub. No.: **WO2013/186490**

PCT Pub. Date: **Dec. 19, 2013**

(65) **Prior Publication Data**

US 2015/0114072 A1 Apr. 30, 2015

(30) **Foreign Application Priority Data**

Jun. 15, 2012 (FR) 12 55602

(51) **Int. Cl.**

B21D 17/02 (2006.01)

B21K 23/00 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **B21D 17/02** (2013.01); **B21J 5/12**
(2013.01); **B21K 23/00** (2013.01); **B60N**
2/4817 (2013.01)

(57)

ABSTRACT

The method for producing at least one notch in an outer wall of a tube includes guiding a first punch being made of a preforming tooth, causing the preforming tooth to penetrate through the wall of the tube until a protuberance is formed, positioning a solid cylindrical mandrel inside the tube. Then, the method includes guiding a second punch with a punching tooth, a leading end of the punching tooth having a shape complementary to a shape of the notch to be made in the wall of the tube, positioning a punching mandrel inside the tube, and having a groove suitable for containing the upset material. The invention can be used for notching headrests for the seats of a motor vehicle.

6 Claims, 2 Drawing Sheets

